REMARKS

Claims 1-25 are pending. Claims 1-14 and 23-25 stand withdrawn from consideration as being directed to a non-elected invention.

Applicants thank the Examiner for the courtesies extended during a March 31, 2006, personal interview with Applicant's undersigned representative, during which the outstanding rejections of record were discussed. The remainder of Applicant's separate record of the substance of the interview is contained in the remarks that follow.

Applicants additionally thank the Examiner for the indication that claim 17 contains allowable subject matter. Because claims 15-16 and 18-22 also contain allowable subject matter at least for the reasons discussed below, it is respectfully submitted that this application is in condition for allowance.

The Office Action rejects claims 15, 20 and 22 under 35 U.S.C. §102(b) as being anticipated by Hums (U.S. Patent No. 4,880,378). This rejection is traversed.

Present claims 15-16 and 18-22 all require "introducing a reducing agent into a flue gas containing nitrogen oxides; **then** passing the flue gas through at least a first layer of nitrogen oxide reducing catalyst where an amount of nitrogen oxides in said flue gas is reduced; **then** passing the flue gas through a heat exchanger **that removes heat** from the flue gas and the reducing agent; and **then** passing the flue gas through at least one additional layer of nitrogen oxide reducing catalyst where an additional **amount of nitrogen oxides** in the flue gas **is reduced**" (see claim, emphasis added).

The Office Action correctly asserts that Hums "discloses a method for NOx reduction in flue gas comprising injecting reducing agent, passing through a catalyst downstream of the injection, then passing through a heat exchanger, then passing

through a second catalyst" (second paragraph in section #2 on page 2 of the Office Action).

However, the present claims require a step that the heat exchanger "**removes** heat from the flue gas" (excerpt of claim 1, emphasis added). The removal – and not the addition – of heat is a basis of the inventiveness of the process, which exploits the effect of lower and not higher flue gas temperatures on the activity of the various types of catalysts described in the application.

In contrast, Hums requires exactly the opposite, namely that the "flue gases which have been mostly but not completely freed of nitrogen oxides are **heated** to above 700°C in the first heat exchanger downstream from the catalyst 37 for removing nitrogen oxides...before being directed to iron-nickel catalyst 39" (see Hums column 6, lines 14-20, emphasis added).

Thus, Hums does not teach (or suggest) "passing [a] flue gas through a **heat exchanger that removes heat** from the flue gas and the reducing agent; and **then** passing the flue gas through at least one additional layer of nitrogen oxide reducing catalyst where an additional **amount of nitrogen oxides** in the flue gas **is reduced**"as required by the present claims.

Although the flue gas is later cooled for desulferization, no additional layer of nitrogen oxide reducing catalyst is provided and no additional amount of nitrogen oxides in the flue gas is reduced, as required by the present claims.

Thus, as elements of the presently claimed invention are missing, it is respectfully submitted that Hums can not anticipate the presently claimed invention.

Therefore, reconsideration and withdrawal of the rejection under 35 U.S.C. 102(b) are respectfully requested.

The Office Action also rejects claims 16 and 18-19 under 35 U.S.C. §103(a) as being obvious over Hums and rejects claim 21 under 35 U.S.C. §103(a) as being obvious over Hums in view of Moller et al. (U.S. Patent No. 4,889,698).

As mentioned above, Hums does not teach (or suggest) "passing [a] flue gas through a **heat exchanger that removes heat** from the flue gas and the reducing agent; and **then** passing the flue gas through at least one additional layer of nitrogen oxide reducing catalyst where an additional **amount of nitrogen oxides** in the flue gas **is reduced**"as required by the present claims.

Although the flue gas is later cooled for desulferization, no additional layer of nitrogen oxide reducing catalyst is provided and no additional amount of nitrogen oxides in the flue gas is reduced, as required by the present claims.

Applicant notes that Hums employs a different catalyst that does not selectively reduce NO to molecular nitrogen and water, but rather purposely produces hydrogen as a byproduct, and a conventional desulfurization process for SO_2 that does not participate in NO removal chemistry.

Applicant further notes that conventional flue gas desulfurization (FGD) is a completely different process than selective catalytic reduction (SCR) NOx control, and there is no physical basis for NOx to be removed within a conventional or even advanced FGD process. (See column 5, lines 4+...."freed of sulfur-containing compounds in the conventional manner....."). Sulfur dioxide (SO_2) is relatively soluble, and is removed by solubilizing gas phase SO_2 into an aqueous-based or other liquid

solution. The dissolved sulfite ion is then removed as a solid, by precipitation with an alkali (usually calcium), and production of a solid byproduct, such as calcium sulfate. Any heat exchanger preceding an FGD process is solely to minimize the water consumption to prepare the aqueous-based alkali slurry, or in the case presented by Hums, to provide for reheat of the water-saturated gas exiting the FGD process. (See column 5, lines 12-13.... "this reheating is required in order to maintain the draft needed in the chimney 19"). As nitrogen oxide (NO) is relatively insoluble, and is not removed within a conventional FGD process, nor is there even a feasible solid byproduct of reaction with NO that could be produced by an alkali, the presence of the FGD is irrelevant to NO.

Regarding the air injected in Hums, air is injected not to cool flue gas, but to provide an oxidizing media and assure that any hydrogen generated by the special-purpose nickel-iron catalyst (not contemplated by the present invention) is consumed. In an example of how Hums differs from the contemplated process, note the special-purpose nickel-iron catalyst, and its characteristic of separating hydrogen (See column 3, lines 10-12). In Figure 2, air introduced at 45 and 40 is to consume any hydrogen that is generated as a byproduct of the NO reducing actions of this special catalyst. (See column 6, lines 23.... "the nitrogen oxides are reduced while ammonia is separated and the excess hydrogen liberated during the separation of ammonia *is oxidized by the atmospheric oxygen to water*"). Also, this air acts to increase and not decrease temperature, through a combustion reaction. (See column 6, line 45..... "the air directed into the combustion chamber 40 immediately burns with the remaining hydrogen and heats the flue gases".)

Hums employs two very different process steps unrelated to the presently claimed method; the presence of a heat exchanger preceding FGD is a standard technique for providing stack draft and plume dispersion and is not intended to enhance process performance with regard to SO_2, or even NO.

Moller et al., which is cited to show contacting with activated carbon to remove mercury, fails to make up for the deficiencies of Hums. The use of activated carbon to remove mercury is unrelated to the invention of present claim 21, which is directed to exploiting the SCR process to oxidize mercury and thus enhance its subsequent removal. In particular, Moller et al. fails to teach (or suggest) "passing [a] flue gas through a **heat exchanger that removes heat** from the flue gas and the reducing agent; and **then** passing the flue gas through at least one additional layer of nitrogen oxide reducing catalyst where an additional **amount of nitrogen oxides** in the flue gas **is reduced**"as required by the present claims.

Thus, as elements of the presently claimed invention are missing from both Hums and Moller et al., it is respectfully submitted that the presently claimed invention would not have been obvious over the combination of the teachings of these two references.

Furthermore, Applicants note that Hums specifically teaches against using a heat exchanger to remove heat prior to removing nitrogen oxides in a nitrogen oxides reducing catalyst, by requiring that the flue gases are **heated** in a **heat exchanger** prior to removing the nitrogen oxides in a nitrogen oxides reducing catalyst.

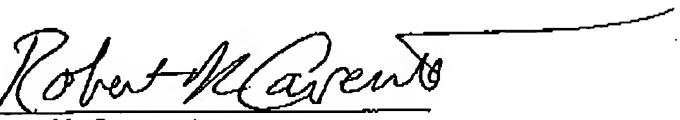
Thus, this teaching against the presently claimed invention in Hums even further demonstrates the nonobviousness of the presently claimed invention.

In view of the above, it is respectfully submitted that the present claims also would not have been obvious over the combination of the applied references.

Therefore, reconsideration and withdrawal of the rejections under 35 U.S.C. 102(b) and 35 U.S.C. 103(a) are respectfully requested.

In view of the above remarks and amendments, Applicant respectfully submits that all of the pending claims are in condition for allowance. Favorable consideration and prompt allowance of the claims and this application are earnestly solicited. Should the Examiner believe anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicant's representative at the telephone number listed below. In the event this paper is not considered to be timely filed, Applicant respectfully petitions for an appropriate extension of time.

Respectfully submitted,



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